V1.0

SERVICE MANUAL

Model: DS-425

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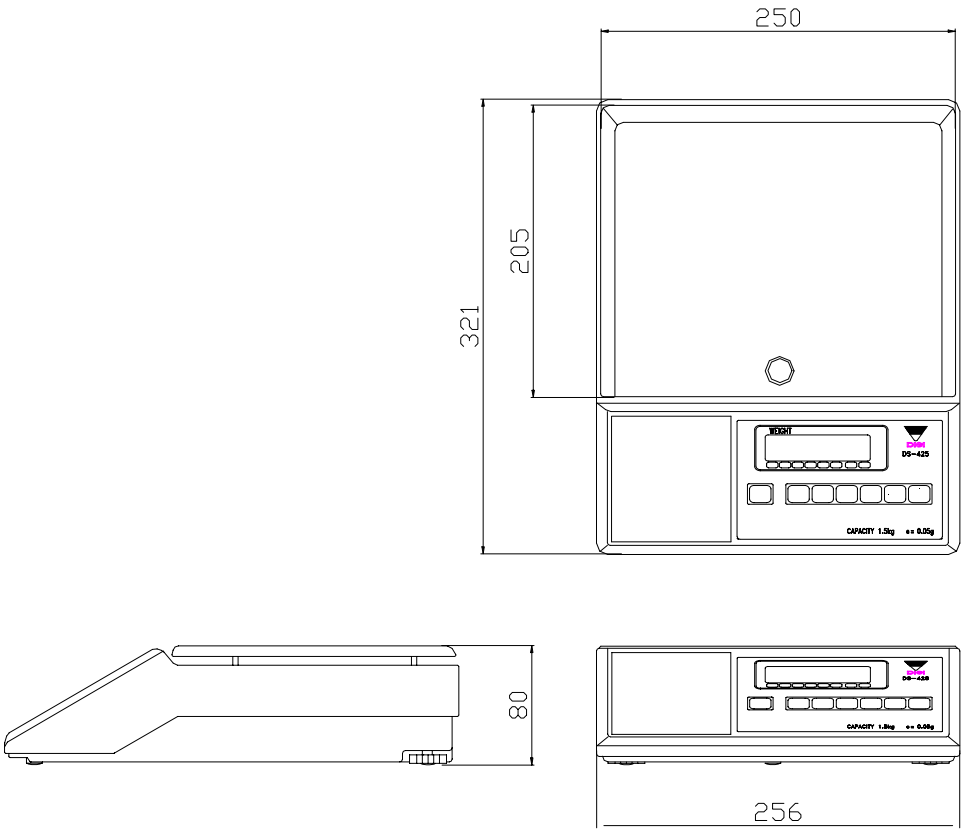
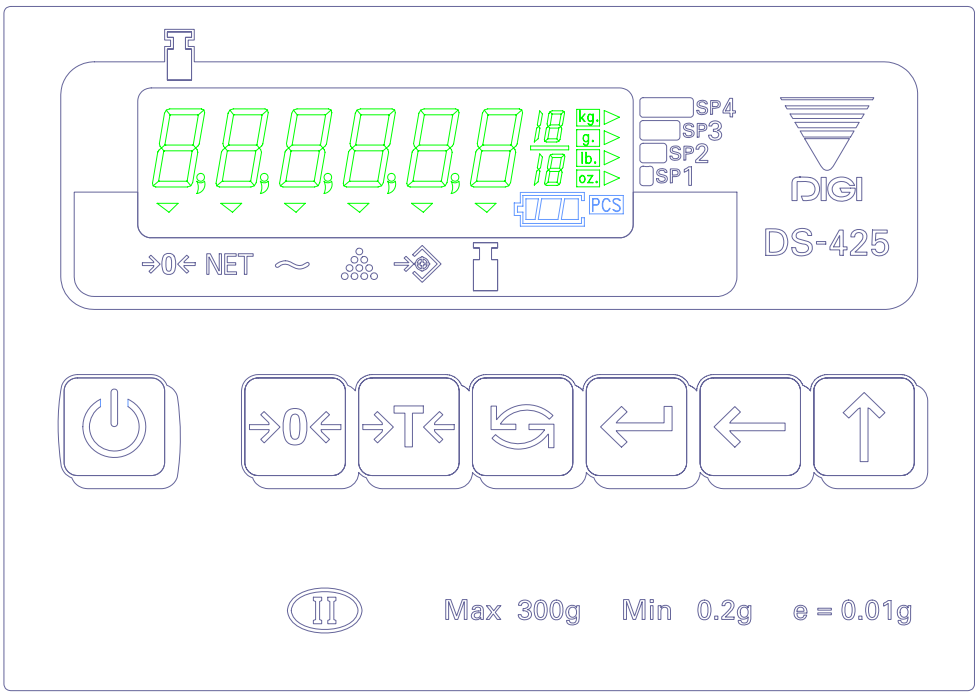
1. General Specification

1.1. Overall Dimension



1.2. Display Panel



1.3. Main Feature

- Model : DS-425
- Display Resolution : 1/1000, 1/1500, 1/2000, 1/2500, 1/3000, 1/5000, 1/6000, 1/7500, 1/10000, 1/15000, 1/20000, 1/25000, 1/30000
- Internal Resolution : 1/250000, 1/300000
- Capacity : 300g, 600g, 1.5kg, 3kg, 6kg, 15kg, 30kg
- Display Tube : Liquid Crystal (With back-light new design GD-584)
- Weight display : 8 Segment , 6 Digit
- Weigh Unit : 4 Symbol (kg, g, lb., oz.)
- Indicators : 4 Set Point (S1, S2, S3, S4), 8 indicators for Zero, Net, Std, U.W, U.C, MEM, BATT, PCS
- Interface : RS-232(OPTIONAL)
- Load cell : 300g-K-Type,600g-30Kg N-Type.
- Mechanical Detail : Housing DS-425W, DS-422 Keyboard
- Physical Dimension : (L)321 * (W)256 * (H)80 mm
  Platter Size: 105mm x 160mm (300g)
  205mm x 250mm (600g Upwards)

1.4. Operation Condition

- Power Source : AC 220V (+10%,-15%) 50HZ/60HZ (Factory Set)
- Temperature : 0°C to 40°C
- Humidity : <85% RH
- Microcomputer : Atmal AT89C52, 8bit
- Display Device : Liquid Crystal Display (With back-light GD-584)
- LCD Display Drive : NEC uPA7225G
- A/D Board : STB-0054 A/D. (DS-422), New A/D Cover

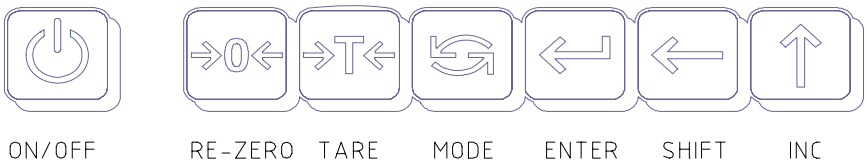
1.5. Main Function

- Basic Weight Unit: g, kg
- Weight Unit Toggle: g, lb, and oz, kg, lb, and oz
- Counting Function
- RS-232C communication

1.6. Layout and Function

1.6.1. Key Sheet and Function

a) Key Layout

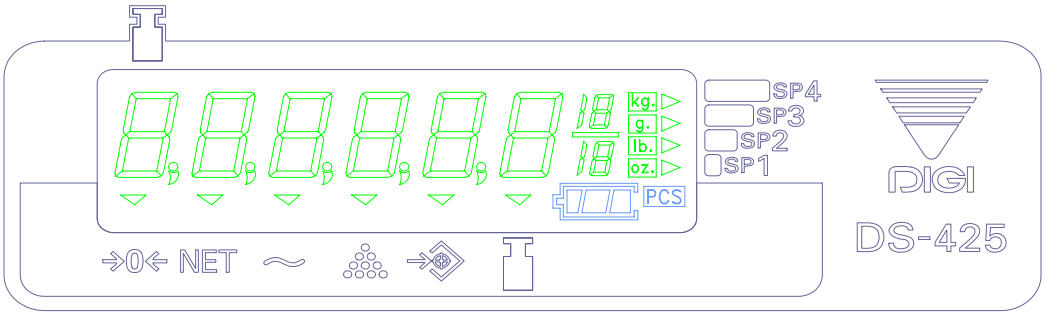


b) Key Function

Key	Function
[On/Off]	For turning the scale ON and OFF
[Re-Zero]	Resetting the scale to zero.
[Tare]	For setting & clearing tare value.
[Mode]	Used to entry into the following modes: Weighing mode or Counting mode.
[Enter]	Used for storing the data.
[Shift]	Used to change digital position.
[INC]	1) Used for increase data value when digit blinking; 2) Switch the weight unit.

1.6.2. Display

a) Layout



b) Indicators

Indicator	Function
->0<-	Light when display is zero and stable
NET	Light when displays net weight
~	Light when weight is stable
U.C	Light when working in counting mode
SAF	Set-point ALAME Mode is ”ON”, and during Fill Application
SAC	Set-point ALAME Mode is “ON”, At Check Weight Application

3. Main Operation

3.1. System On

Indication Flag: B - Bright S - Sparkling

1-ZERO 2-NET 3-STD 4-U.C 5-SAF 6-SAC 7-S1 8-S2 9-S3 10-S4

Operation	Key	Weight		Indicator										Remarks
				1	2	3	4	5	6	7	8	9	10	
Press [On/Off]	[On/Off]	dS-425												Model Name
		Ur. 1.00												Software Version
		000000												Segment Checking
		111111												
		999999												
		0.0000	kg	B		B								Weighing Mode

3.2. One Touch Tare

Indication Flag: B - Bright S - Sparkling

1-ZERO 2-NET 3-STD 4-U.C 5-SAF 6-SAC 7-S1 8-S2 9-S3 10-S4

Operation	Key	Weight		Indicator										Remarks
				1	2	3	4	5	6	7	8	9	10	
Weight Stable		0.0000	kg	B		B								Weighing mode
Load tare weight on		1.2220	kg			B								Weight display
Excute tare	[Tare]	0.0000	kg		B	B								Net display
Load more weighing		1.0000	kg		B	B								
Remove all items		-1.2220	kg	B	B	B								Minus tare weight
Tare clear	[Tare]	0.0000	kg	B		B								Weighing mode

Note: This operation is based on No Auto TARE CLEAR, SPEC10 BIT1=0.

3.3. Digital Tare Operation

Indication Flag: B - Bright S - Sparkling

1-ZERO 2-NET 3-STD 4-U.C 5-SAF 6-SAC 7-S1 8-S2 9-S3 10-S4

Operation	Key	Weight		Indicator										Remarks
				1	2	3	4	5	6	7	8	9	10	
Weight Stable		0.0000	kg	B		B								Weighing mode
Enter into tare setting mode	[Shift]	0.0000	kg	B		B								Right digit is blinking
Set tare value	[Shift] [Shift] [INC]	0.00100	kg	B		B								Tare weight set
Excute tare	[Tare]	-0.00100	kg	B	B	B								Minus tare weight
Tare clear	[Tare]	0.0000	kg	B		B								Weighing mode

Note: This function is available when SPEC10 BIT2=1 only.

3.4. Gross / Net Display Toggle

Indication Flag: B - Bright S - Sparkling

1-ZERO 2-NET 3-STD 4-U.C 5-SAF 6-SAC 7-S1 8-S2 9-S3 10-S4

Operation	Key	Weight		Indicator										Remarks
				1	2	3	4	5	6	7	8	9	10	
Weight Stable		0.0000	kg	B		B								Weighing mode
Load weight (eg.0.6000kg)		0.6000	kg			B								Gross weight display
Excute tare	[Tare]	0.0000	kg		B	B								Net display
Toggle	[INC]	0.6000	kg			B								Gross Weight display
Remove item		0.0000	kg	B		B								Weighing mode
Toggle	[INC]	-0.6000	kg	B	B	B								Net weight
Tare clear	[Tare]	0.0000	kg	B		B								Weighing mode

Note: The function is available when SPEC11 BIT0=1 only.

This function will be unavailable when Weight Unit Conversion function is enabled.

3.5. Weight Unit Conversion

Indication Flag: B - Bright S - Sparkling

1-ZERO 2-NET 3-STD 4-U.C 5-SAF 6-SAC 7-S1 8-S2 9-S3 10-S4

Operation	Key	Weight		Indicator										Remarks
				1	2	3	4	5	6	7	8	9	10	
Weight Stable		0.0000	kg	B		B								Weighing mode
Load weight (eg.0.6000kg)		0.6000	kg			B								
Convert	[INC]	1.3225	lb			B								Pound display
Convert	[INC]	21.165	oz			B								Ounce display
Convert	[INC]	0.6000	kg			B								Basic unit display
Remove items		0.0000	kg	B		B								Weighing Mode.

Note: This operation is available when SPEC15 = 0100 or 1100 only.

3.6. Counting Operation

Indication Flag: B - Bright S - Sparkling

1-ZERO 2-NET 3-STD 4-U.C 5-SAF 6-SAC 7-S1 8-S2 9-S3 10-S4

Operation	Key	Weight		Indicator										Remarks
				1	2	3	4	5	6	7	8	9	10	
Weight Stable		0.0000	kg	B		B								Weighing mode
Press [MODE]	[Mode]	Add 32					B							Sample number 32
Change number	[Shift][Shift]	Add **3**2					B							2nd digit selected
Chang value	[INC][INC]	Add **5**2					B							Sample number 52
Confirm	[*]	0.0000	kg	B		B	B							Sample weight
Load 52 samples		0.6000	kg			B	B							Weight for all samples
Confirm	[*]	52	kg			B	B							Counting mode
Exit	[Mode]	0.6000	kg	B		B								Weighing mode

3.7. Set-Point Setting (SPEC8 BIT0 = 1)

Indication Flag: B - Bright S - Sparkling

1-ZERO 2-NET 3-STD 4-U.C 5-SAF 6-SAC 7-S1 8-S2 9-S3 10-S4

Operation	Key	Weight		Indicator										Remarks
				1	2	3	4	5	6	7	8	9	10	
Weight Stable		0.0000	kg	B		B								Weighing mode
Enter into setting mode	[Mode] [Mode]	SET-1												Set for Point 1 *1)
Confirm	[Enter]	0.000**0**	kg							B				Set value
Value change	[Shift] [INC]	0.00**5**0	kg							B				[Shift] key to select the digit, [INC] key to change the value of digit selected *1)
Confirm	[Enter]	SET-2												Set-Point 1 saved
Point 2 setting	[Enter]	0.000**0**	kg								B			Set value *2)
Value change	[Shift] [INC]	0.0**1**00	kg								B			Same method as point 1 setting *2)
Confirm	[Enter]	SET-3	kg											Point 2 saved *3)
Confirm	[Enter]	0.000**0**	kg									B		Set value *3)
Value Change	[Shift] [INC]	0.0**1**00	kg									B		Same procedure as point 1 & 2 setting *3)
Confirm	[Enter]	SET-4	kg											Point 3 saved *4)
Confirm	[Enter]	0.000**0**	kg										B	Set value *4)
Value change	[Shift] [INC]	0.0**1**00	kg										B	Same method as above *4)
Confirm	[Enter]	0.0000	kg	B		B								Point 4 saved and back to weighing mode *4)

Note 1: The indicators S1, S2, S3, S4 will be lighted when setting the corresponding Set-Point.

Note 2: When the weight exceeds the value of Set-Point 1, the indicator S1 will light.

When the weight exceeds the value of Set-Point 2, the indicator S1 and S2 are light.

When the weight exceeds the value of Set-Point 3, S1, S2 and S3 are light.

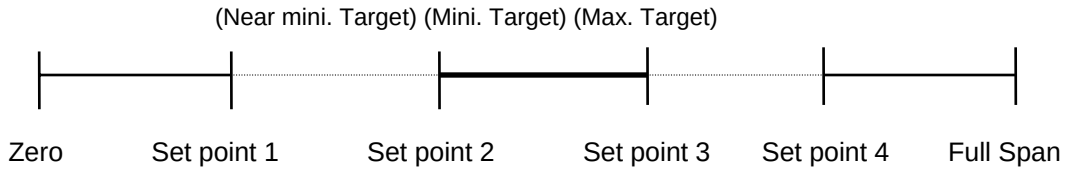
When the weight exceeds Point 4, S1, S2, S3 and S4 are light.

3.8. Set-Point Alarm Function

This function has two methods: **Filling** and **Weight Check Method**.

3.8.1. Filling Method

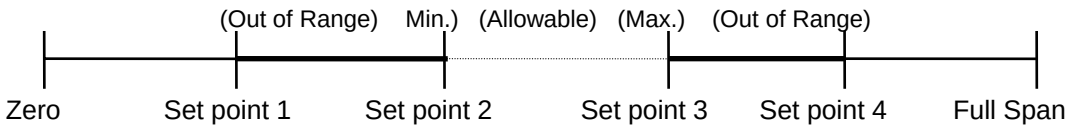
Operator fills the item on the platter up to the target weight range. The target range is determined by 2-set-point (set-point 2 and set-point 3) and continuously fast alarm will be alert. So operator can know the weight is within the target-weight range. Set point 1 and set point 2 may be programmed as a fine adjustment range. The intermediate alarm notes to operator the weight is closed to target weight.



Note: ..... continuous slow alarm ——— continuous fast alarm

3.8.2. Weight Check Method

Operator places item on the platter and check (confirm) whether the weight of the item is within allowable error range. Basically the allowable error range can be defined via the setting of 2-set-points (For example: set point 2 and set point 3). And also you can set the range within point 1 till point 2 and point 3 till point 4 is out of allowable range. Then the operation can judge the weight error is allowable for not via the sound of alarm.



Note: ..... Continuous slow alarm, ——— Continuous fast alarm

For Example:

Set-point 1 = 0.0100kg, Point 2 = 0.0200kg, Point 3 = 0.0350kg, Point 4 = 0.0550kg

Indication Flag: B - Bright S - Sparkling

1-ZERO 2-NET 3-STD 4-U.C 5-SAF 6-SAC 7-S1 8-S2 9-S3 10-S4

Operation	Key	Weight		Indicator										Remarks
				1	2	3	4	5	6	7	8	9	10	
Weight Stable		0.0000	kg	B		B								Weighing Mode
Press [Enter]	[Enter]	0.0000	kg	B		B		B						Filling application
Load 0.0150kg		0.0150	kg			B		B		B				Fast alarm start
Load 0.0150kg		0.0300	kg			B		B		B	B			Slow alarm start
Load 0.0150kg		0.0450	kg			B		B		B	B	B		Fast alarm start
Load 0.0150kg		0.0600	kg			B		B		B	B	B	B	Alarm off
Remove all item		0.0000	kg	B		B		B						
Press [Enter]	[Enter]	0.0000	kg	B		B			B					Weight check method
Load 0.0150kg		0.0150	kg			B			B	B				Fast alarm start
Load 0.0150kg		0.0300	kg			B		B	B	B	B			Slow alarm start
Load 0.0150kg		0.0450	kg			B		B	B	B	B	B		Fast alarm start
Load 0.0150kg		0.0600	kg			B		B	B	B	B	B	B	Alarm off
Remove all item		0.0000	kg	B		B		B	B					
Press [Enter]	[Enter]	0.0000	kg	B		B								Weight check mode

4. RS-232C Protocol

4.1. Communication Specs

Baud Rate: 2400, 4800, 9600, 19200.

Start Bit: 1

Stop Bit: 1

Data Length: 8

Parity Bit: None

4.2. Communication Text Command

Termination Code	CR	The end of data	0DH
	LF	The end of Text	0AH
Data	0 ~ 9	Numeric data	(30H~39H)
	- (Minus)	Minus sign	2DH
	. (Period)	Period	2EH
	, (Comma)	Comma	2CH
Header Code	0	Net Weight	30H
	4	Tare Weight	34H
Stable sign	Null	Stable	00H
	SOH	Un-stable	01H

4.3. Data Format

The SPECs to alter the supplement of header code and the status of weight stability are newly added to specification setting. (Header Code Selection SPEC02 Bit 0, Weight Stability Selection SPEC02 Bit 1)

4.3.1. Without header-code and weight stable code (Total 17 Bytes)

Net Weight	CR	Tare Weight	CR	LF
7 Byte	1byte	7 Byte	1 Byte	1 Byte

4.3.2. Without header-code and with weight stable code (Total 19 Bytes)

Stable status	CR	Net Weight	CR	Tare Weight	CR	LF
1 Byte	1 Byte	7 Byte	1byte	7 Byte	1 Byte	1 Byte

4.3.3. With header code and Without weight stability code (Total 19 Bytes)

Header	Net Weight	CR	Header	Tare Weight	CR	LF
1 Byte	7 Byte	1byte	1 Byte	7 Byte	1 Byte	1 Byte

4.3.4. With header and weight stability code (Total 21 Bytes)

Stable Code	CR	Header Code	Net	CR	Header Code	Tare	CR	LF
1 Byte	1 Byte	1 Byte	7 Byte	1byte	1 Byte	7 Byte	1 Byte	1 Byte

e.g.) With Header code and weight stability code

Net weight =-1,2340 Tare weight = 0,450 and weight is stable

Null	CR	0	-	0	1	,	2	3	0	CR	4	0	0	0	,	4	5	0	CR	LF

Note 1): The data format consists of (header code), minus/plus sign, numeric data and decimal point. If weight data is minus, -(2DH) is added after header data. If weight is positive data, 0(30H) is output.

Note2): The data is aligned from right side.

Note3): When weight is over the capacity, the following data is output:

0OV00000CR4???????CRLF (With Header Code)

Note4): By specification setting, the decimal point can be set to period (2EH) or comma (2CH).

4.4. Communication Method

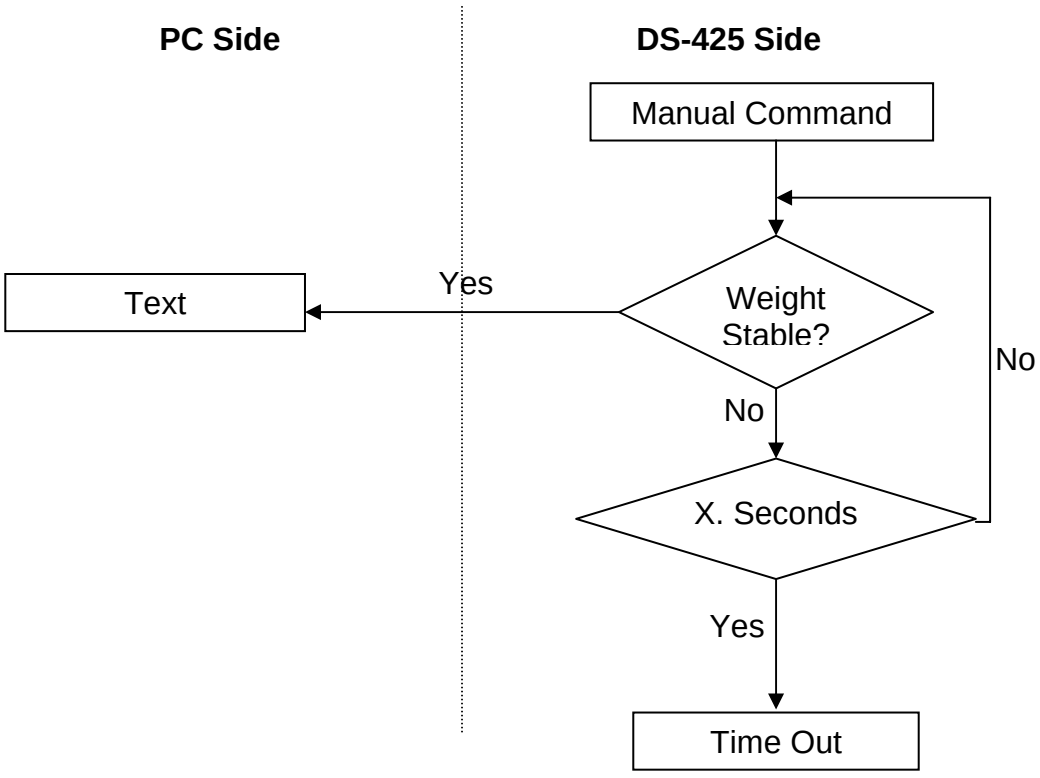
Communication method can be set as Stream Output, Manual and Command.

4.4.1. Stream Output (Continuously Output)

Data will output to PC side continuously. Please also define the contents of data on SPEC 03 bit 0&1) is not effective.

4.4.2. Manual Command

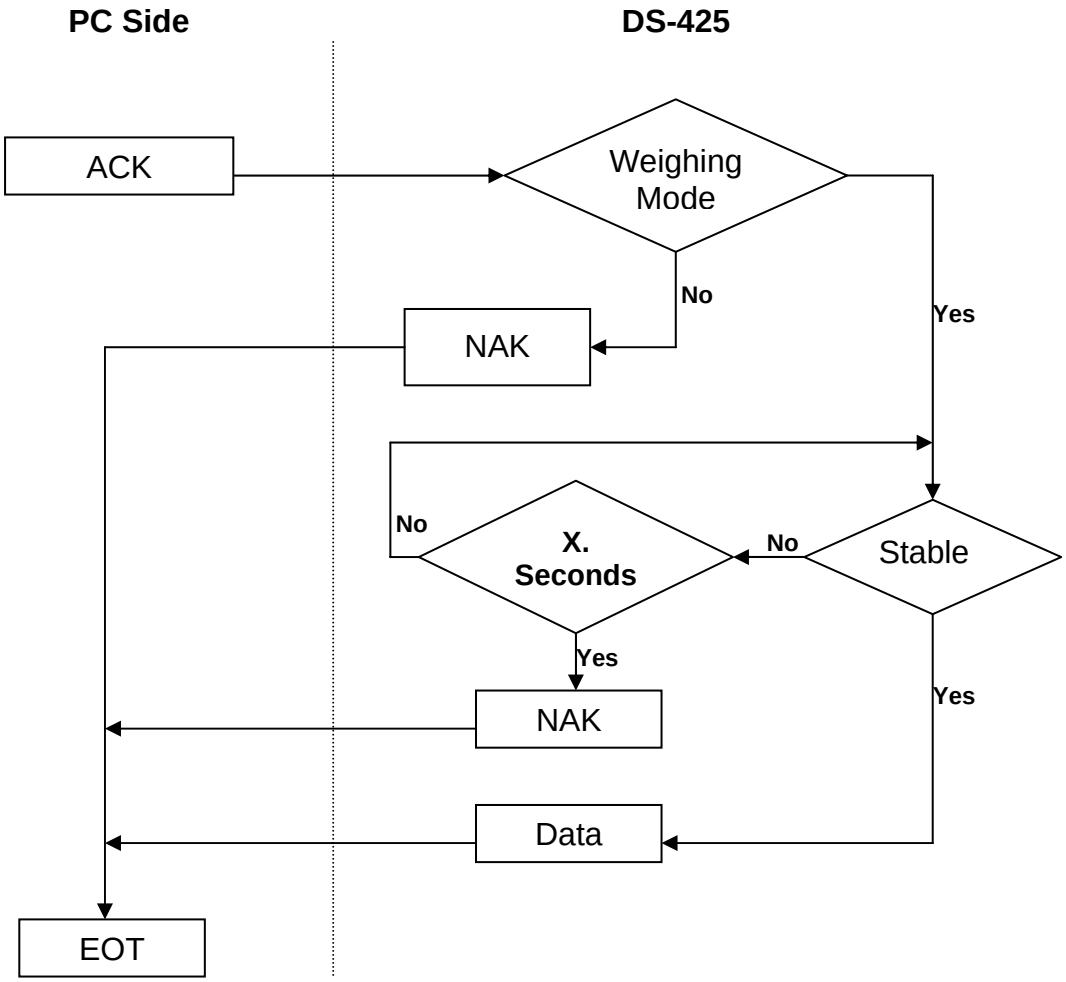
Data will output when [↑] key pressed, user may select to output data right away or hold the command until weight stable by specification setting. If weight is not stable within certain interval, Error message “ERR C” will appear on the display.



4.4.3. External Command

Data will be output when DS-425 receives the command (ACK 06H) form PC. PC send a data request signal ACK to DS-425 side, then DS-425 transmits the weight data to PC after received the request signal, the weight data will be transferred immediately or hold the command till weight stable. If weight cannot be stable within the certain interval (set by specification), DS-425 will transmit NAK (15H) to PC.

Note: If ACK signal is sent to DS-425 during digital tare or re-zero operation, NAK signal will be sent to PC.

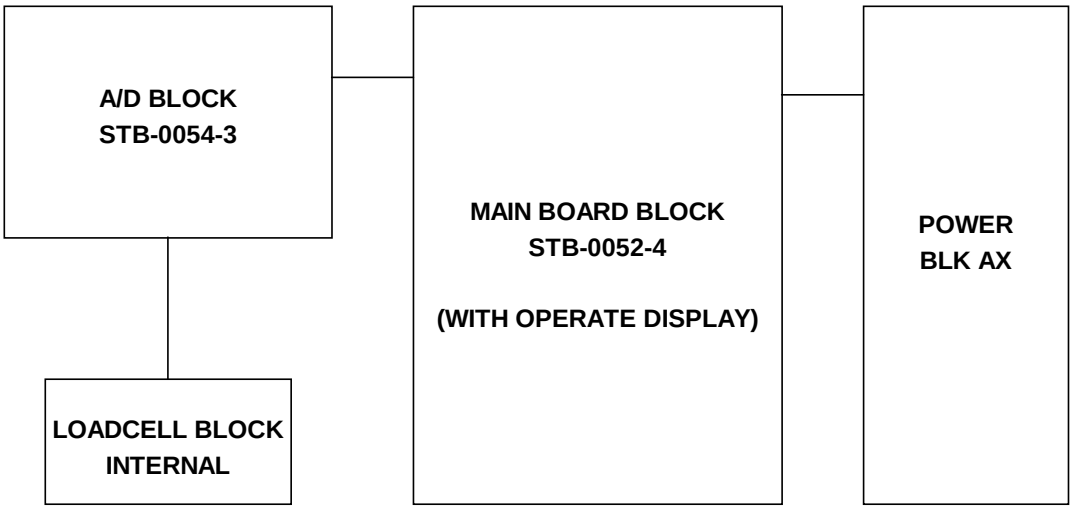


5. Hardware Specification

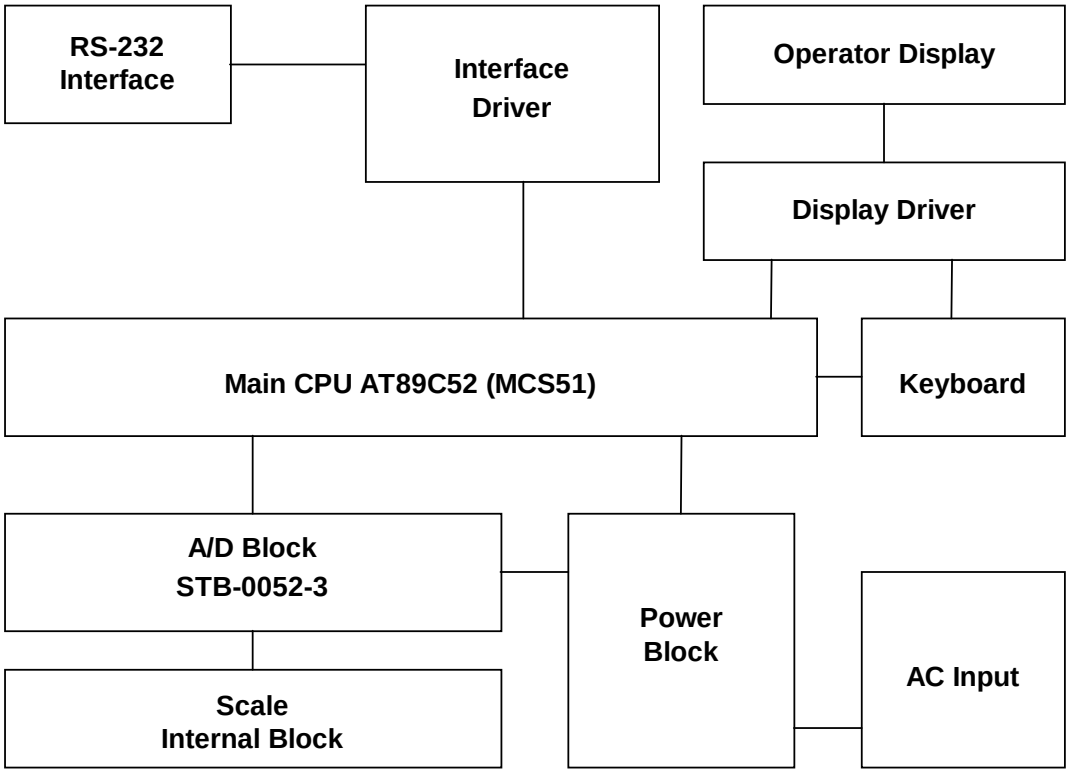
5.1. Main Components

- Microcomputer: ATMAL AT89C52 8 bit
- LCD Display Driver: NEC uPA7225G
- A/D Board: STB-0054, (FOR DS-422), New A/D Cover.

5.2. Block Diagram



5.3. Electronic Connection Diagram



5.4. Circuitry Diagram

Please See Attached Pages for

DS-425 Circuitry Diagram

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Shanghai Teraoka Electronic Co., Ltd.